



Digital Reality: What's Next After Google Glass?

July 15, 2021

In less than a decade we've moved from Google smart glasses to Oculus virtual reality headsets; what's next? In the third installment of our Convergence series, which examines five growth themes that are shaping the future of investing, Hugo Scott-Gall speaks with Global Research Analysts Bill Benton, CFA, and Drew Buckley, CFA, to discuss a vision of the internet in which the virtual and physical worlds become a seamlessly interconnected realm.

Comments are edited excerpts from our podcast, which you can listen to in full below.

https://media.blubrry.com/the_active_share/b/content.blubrry.com/the_active_share/The_Active_Share_Metaverse_Epis

What is the metaverse? Am I in it? Are you in it?

Bill: It's actually not a simple question. I don't know if there is one definition. I think of it as effectively doing everything you do in the physical world within a digital ecosystem. People sometimes think about it as a Roblox or Minecraft experience, where you can create things, interact, and spend money virtually. That gets close, but so does the Tencent ecosystem in China. They have a gaming platform, a chatting platform, entertainment payments, and programs that allow you to connect.

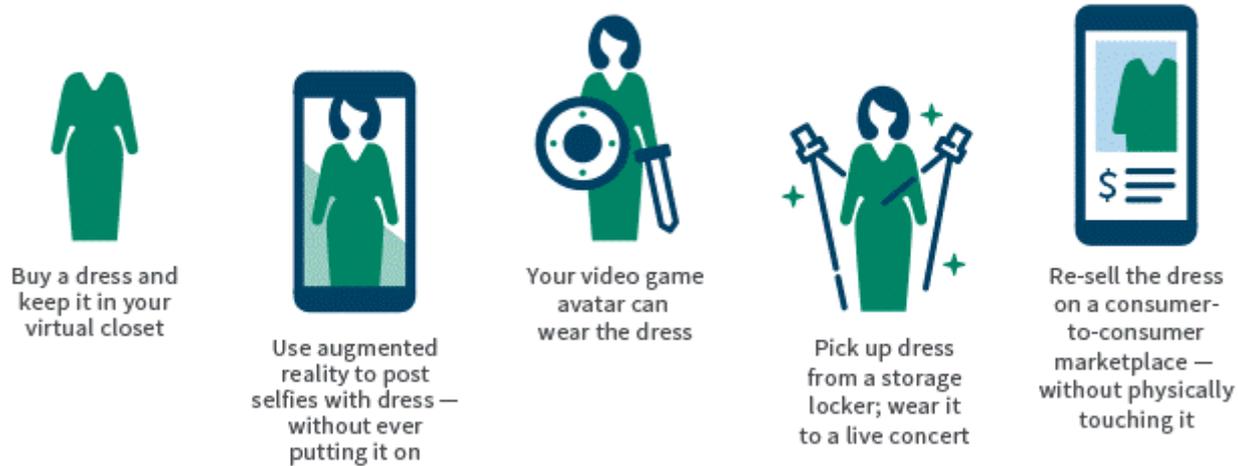
Do you agree with that, Drew?

Drew: Yes. If you're a science fiction reader, *Ready Player One* or *Ready Player Two* are great descriptions of the

metaverse. Effectively, at the end point, as Bill was saying, your whole life is lived in digital form. You have a body, of course, and you sustain that life in the physical world, but everything else you do is digital. That's where you get your education, where you work, where you spend your leisure time. Even sensations—touch, smell, sight—are communicated from the digital reality to your body.

Bill: Obviously we're not in that metaverse yet. We're in this in-between state we call "digital reality," where the virtual and physical worlds are becoming interconnected. Pokémon GO is one example; you can also try on eyeglasses online. Technology itself is not as pervasive as it needs to be to get us to real digital engagement.

Virtual and Physical Worlds Interconnected



Source: William Blair, as of May 2021.

There is an argument that virtual and augmented reality are conceptually appealing, but their growth has been a disappointment. The penetration hasn't come through in the way some have forecast. What are the constraining factors from a technology point of view?

Bill: The technology is older than you would expect. Nintendo offered a Virtual Boy 3D gaming system in the mid-1990s; a decade ago we were talking about Google Glass. But it hasn't taken off, like you said. A couple of years ago I was talking to a manufacturer of virtual reality devices in China, and it was always "tomorrow."

Adoption has been slow because of a bad customer experience. You had a chicken-and-egg problem. You need good hardware, but you also need good software. It was disappointing until the last year. Now it feels like the software and hardware are connecting. Unit production of virtual reality headsets is doubling, but so is demand, so it's still hard to find some of the devices that allow you to interact with this virtual world.

Drew: The one thing I'd add to that is connectivity. You need fast speed, low latency, and a lot of bandwidth to deliver the information and graphics necessary to make the metaverse a real thing, and we just aren't there yet. But 5G is going to be a big step in that direction. And 5G's not the end: there will be 6G, 7G, 8G, 9G.

You also need people to adopt the new technology. The younger generations are much faster to adopt. But older generations, even people my age, in their 30s, need to know why you'd want something like this. You have to prove this new technology is better for you than whatever you're giving up to use it.

So there are three things: hardware/software, connectivity, and consumer adoption. Let's focus on the hardware and software for a moment. When do you think we're going to see the technology widely adopted? Because the third part, consumer adoption, is really going to be driven by the first two.

Bill: I think we're on the edge right now. You're seeing the hardware in smartphones—camera technology that's allowing for a 3D experience is coming to market. And companies are getting more serious about building the software because they now see the need for it. Virtual reality (VR) headset sales doubled last year, and are

expected to double again this year, but they're sold out. Something is clearly happening in gaming.

Companies I speak to are discussing augmented reality more than ever because they know it has potential to disrupt their place in the market. If they can use it to create a great customer experience, they can take share from offline retailers, and they can move markets that need the technology to drive penetration but have been slow to adopt.

Drew: I think with hardware and software, you get a layering-on effect. The first set of hardware and software solves the first set of problems; the next set solves the next set of problems; and so on. Now we're really starting to see hardware and software enable some of the use-cases you want. We'll have hardware that can deliver better graphics, and motion capture that doesn't make you feel sick. I think we're on the cusp of a breakthrough.

Bill: Some people thought cloud computing wouldn't happen. It went through a period of long adoption because people said things like, "Oh, there are security issues." But they came up with better solutions, people came around, and the technology ultimately took off. Now everyone says everything is going to be on the cloud.

We're at a similar stage when it comes to enabling tools in the e-commerce landscape. No one's using them today because they aren't good enough, but that doesn't mean that they aren't going to be important for tomorrow's future shopping experience.

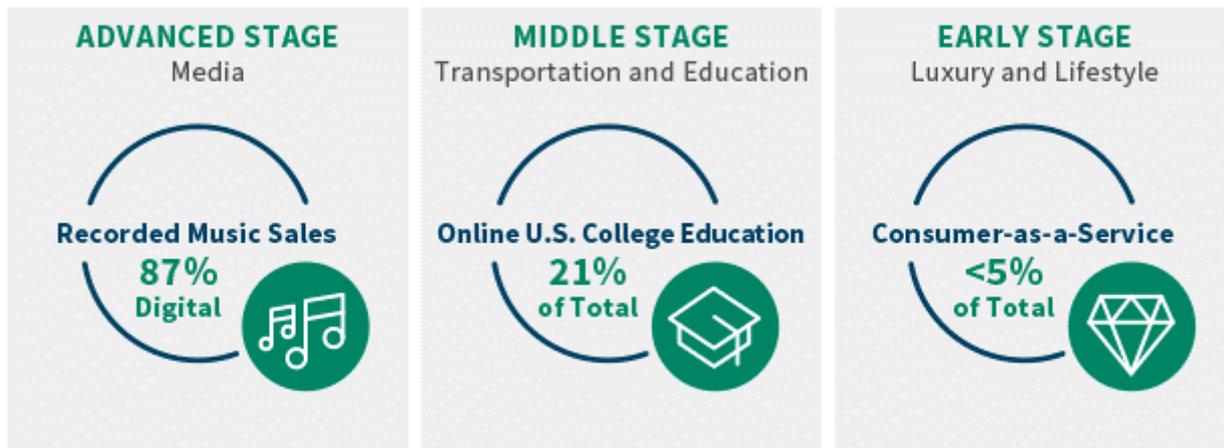
And the product that require this kind of interaction—like identifying the eyeglasses you're going to wear—are penetrated at levels half that of overall spending. So, this type of technology is necessary, and it is coming. I actually think we're at that stage. I think we're getting right at the point of inflecting in this space.

From a hardware/software point of view, are there any other areas you think present a big investment opportunity?

Bill: In terms of finding investment themes around this, we're often going to be looking at it as an enabling technology, very much the way I think artificial intelligence is for software. It improves existing products, but you're going to see it used in areas you don't see today, like education or surgery. That could expand total addressable markets. I think it will find itself into many of our existing investments. And it could be very disruptive to companies that don't adopt the technology because somebody will move their cheese.

How Big Could the Profile Pools Be?

Digital reality is here, but its advancement depends on the sector.



Sources: For music, RIAA as of 2019; for college education, University of Texas at El Paso (UTEP) for as of January 2018; for luxury and lifestyle, William Blair estimates as of February 2021.

We spent a lot of time on the key enabling technologies, but I'm wondering if that is only half the battle when it comes to understanding this technology. Do we also need psychology—some deep insight into the human soul and its needs and its wants and desires? Is the toolkit required of an investor here different when predicting how people behave in the digital world versus the physical world?

Drew: That's a great point. We talk a lot about tapping into the human condition to understand what people want.

Going back to your last question, content is also an area of opportunity, a profit pool that should continue to expand. Think about how advertising has moved online over the last 20 years. I might be unique, but I don't actually mind getting ads pushed at me on Instagram if they're for products I think I might use. Advertisers have created an interesting proposition in knowing what I want and serving me ads related to that.

If you think that through to the logical endpoint—how understanding human behavior can increase happiness—I'm not mad that they're driving something to me that way. But the darker side is that they have all my information.

You give up an element of free will to get served ads that make your life easier by helping you find products you like. I think it's important for companies to understand that as they look to these profit pools. What do people really want? What are they willing to give up to get it?

Bill: I'd just add that humans are looking for social connection, and this technology can add to a feeling of true social connection. They're now putting VR technology in nursing homes to create a family connection remotely. It's solving a loneliness problem.

Drew: Another example is TikTok. Think how quickly that took off. To know that was coming, you would have had to understand what people are seeking in their social experience online. You would have had to understand all the building blocks that came before it: Instagram, Twitter, QQ, Tencent, WeChat, etc. What do

people want to use the internet for? What need is it providing? I think that will be really important to understand. And knowing that, we'll know where the profit pools are going.

Bill: Another area where I think the technology can be used is around experiences. Disney World puts you in a ride where you fly across the world, and as you're soaring they blow things on you. That kind of experience is another social need—to experience something different. Not everyone can do that, and the technology allows you to have these types of experiences.

Has the hierarchy of needs simply been transplanted from the physical world to the digital world? So people behave in the digital world the same as they do in the physical world? Or is the digital world freeing in a way, leading people to behave differently? It can be a chance for reinvention. There are fewer constraints. I ask because I think there is tremendous upside for us as investors in getting it right.

Drew: I think it's different. The digital world allows anonymity: You can change who you are depending on which reality you're in. There are also all sorts of smaller communities where you can seek out like-minded people, which is more difficult in the physical world. And you can broadcast as much as you want. You can show yourself doing dances on TikTok or show pictures of your kids on Instagram, or just consume. And because digital reality allows people to be different, you need psychology. We're not psychologists, but we try to understand what makes somebody do something. We keep coming back to that as we try to understand what drives user engagement and staying power, then how to monetize that.

Bill: I think at the core the wants and needs are exactly the same, but there is a greater likelihood of bad behavior in the digital world than the physical world. A social contract exists in the physical world that is just generally more broken in the digital world. People do dances in both worlds, but in the digital world you have people who want to signal their status. They'll throw virtual flowers that cost thousands of dollars at performers they like; they'll throw virtual eggs at people who don't sing quite as they should when doing karaoke.

Drew Buckley, CFA, partner, and William Benton, CFA, partner, are research analysts on William Blair's Global Equity team.

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